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Using technology to find the secret places of the heart

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1 Guest Editorial

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4 **Using technology to find the secret places of the heart**

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7 Over the last two decades there has essentially been a revolution in echocardiography
8 with the introduction of multiple new technologies, tools and parameters. Today, the heart is
9 not just evaluated with simple motion mode and 2-dimensional (2D) imaging but modalities
10 have been expanded with color, spectral and tissue Doppler and 3-dimensional (3D) imaging.
11 New tools are usually first introduced in human cardiology and later adopted in veterinary
12 cardiology, but technologies can also be used first in research animals to assess feasibility and
13 safety issues. Sometimes with new tools and technologies, lots of data and publications are
14 produced without necessarily a prior clear hypothesis or clinical question to be answered, i.e.
15 ‘research’ data might be generated mainly because of the availability of a tool. Likewise,
16 some tools or parameters do not make it very far in clinical practice because, despite being
17 fancy, they do not actually improve diagnostic accuracy or patient care. However, other tools
18 reach fundamental importance.

19
20 One of the ‘newer’ and specialized technologies is transesophageal echocardiography
21 (TEE). As a matter of fact, the technology is not really new, the first steps having been
22 undertaken in humans already in 1976 (Frazin et al., 1976), and in research dogs in 1990
23 (Urbanowicz et al., 1990). TEE certainly qualifies as fancy modality, but at least in human
24 medicine it is today an essential tool for multiple indications and particularly for monitoring
25 cardiac catheter interventions (Kamra et al., 2011).

26
27 Since the first application in veterinary medicine, a number of well-designed studies
28 have shown the potential and importance of TEE in small animals (Pariaut et al., 2004;
29 Gordon et al., 2010; Saunders et al., 2007 and 2010). Even though several veterinary

cardiologists are using TEE on a routine basis today, the technology still is not widely used. An important reason for this limited use is the lack of structured education with this tool i.e. most veterinary cardiologists have to learn to use it by trial and error. In a busy clinical environment, this limits its propagation.

In a recent issue of *The Veterinary Journal*, Domenech and Oliveira (2013) presented a very detailed review on TEE in dogs. This article provides an excellent summary of how to perform a step-by-step structured TEE exam, how to obtain the various positions, which settings to use to optimize the image acquisition and quality, and which positions to use for which clinical indication. This article is a treat for every veterinary cardiologist who would like to make a start with TEE or to improve his/her skill. This article should help many to learn TEE in significantly shorter time and thus will allow its broader use in the veterinary community. This should not only improve patient care in specialized catheter interventions, but it has large potential in diagnostic cardiology as well as in anesthetic and critical care monitoring (Au and Vieillard-Baron, 2012). As increased familiarity and confidence is gained with veterinary TEE, we may find further applications and advancements in this fascinating echocardiographic field that are suited to veterinary clinical research and practice.

In human cardiology today 3D TEE has already superseded 2D TEE in the field of reconstructive valve surgery and quantitative assessment of valve regurgitation (Sudhakar et al., 2012). Most recent exciting work includes contrast enhanced 2D TEE for atrial thrombus detection in patients with atrial fibrillation (Jung et al., 2013) and the use of 72 h miniaturized indwelling 2D TEE probes for hemodynamic monitoring in ventilated critically ill patients (Vieillard-Baron et al., 2013).

As the sophistication of veterinary medicine grows with each passing year and the human-animal bond strengthens, owners expect the most advanced care for their pets and our veterinary patients deserve it. TEE is a step forward in diagnostic and minimally invasive cardiac procedures and case management in an intensive care setting helping us explore secret places of the canine heart that were previously hidden to us.

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